



COVER LETTER

Wednesday, December 15, 2010

David L. Mayerson
NMED
1190 St Francis Dr
N2300
Santa Fe, NM 87502

TEL: (505) 476-3777
FAX

RE: Grants Mining District

Order No.: 1011679

Dear David L. Mayerson:

Hall Environmental Analysis Laboratory, Inc. received 6 sample(s) on 11/17/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman".

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901
AZ license # AZ0682
ORELAP Lab # NM100001
Texas Lab# T104704424-08-TX



Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-01

Client Sample ID: GMD-00
Collection Date: 11/8/2010 9:23:00 AM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|--------|------|------|------------------------|----|------------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 11 | 10 | | mg/L | 20 | 11/30/2010 12:37:36 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 1.0 | | mg/L | 5 | 12/6/2010 8:36:21 PM |
| Sulfate | 20 | 10 | | mg/L | 20 | 11/30/2010 12:37:36 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO ₃) | ND | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:38:00 PM |
| Carbonate | ND | 2.0 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:38:00 PM |
| Bicarbonate | ND | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:38:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| Total Dissolved Solids | 62.0 | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-02

Client Sample ID: GMD-01
Collection Date: 11/8/2010 9:55:00 AM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|--------|------|------|------------------------|----|------------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 5.0 | 0.50 | | mg/L | 1 | 11/30/2010 9:59:19 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 1.0 | | mg/L | 5 | 12/6/2010 8:53:45 PM |
| Sulfate | 52 | 10 | | mg/L | 20 | 11/30/2010 12:55:00 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO ₃) | 160 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:44:00 PM |
| Carbonate | ND | 2.0 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:44:00 PM |
| Bicarbonate | 180 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:44:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| Total Dissolved Solids | 291 | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-03

Client Sample ID: GMD-04
Collection Date: 11/8/2010 1:35:00 PM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|------------|------|------|------------------------|----|-----------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 19 | 10 | | mg/L | 20 | 11/30/2010 1:12:24 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 1.0 | | mg/L | 5 | 12/6/2010 9:11:10 PM |
| <u>Sulfate</u> | <u>270</u> | 10 | | mg/L | 20 | 11/30/2010 1:12:24 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO ₃) | 270 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:55:00 PM |
| Carbonate | ND | 2.0 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:55:00 PM |
| Bicarbonate | 270 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 5:55:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| <u>Total Dissolved Solids</u> | <u>709</u> | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-04

Client Sample ID: GMD-05
Collection Date: 11/8/2010 1:35:00 PM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|--------|------|------|------------------------|-----|------------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 1500 | 100 | | mg/L | 200 | 11/30/2010 10:10:34 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 4.0 | | mg/L | 20 | 11/30/2010 10:55:29 PM |
| Sulfate | 280 | 10 | | mg/L | 20 | 11/30/2010 1:29:49 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO ₃) | 390 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 6:08:00 PM |
| Carbonate | ND | 2.0 | | mg/L CaCO ₃ | 1 | 11/18/2010 6:08:00 PM |
| Bicarbonate | 390 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 6:08:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| Total Dissolved Solids | 3070 | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-05

Client Sample ID: GMD-02
Collection Date: 11/9/2010 9:36:00 AM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|-------------|------|------|------------------------|----|-----------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 64 | 10 | | mg/L | 20 | 11/30/2010 1:47:13 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 1.0 | | mg/L | 5 | 12/6/2010 9:28:34 PM |
| <u>Sulfate</u> | <u>470</u> | 10 | | mg/L | 20 | 11/30/2010 1:47:13 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO ₃) | 310 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 8:15:00 PM |
| Carbonate | 20 | 2.0 | | mg/L CaCO ₃ | 1 | 11/18/2010 8:15:00 PM |
| Bicarbonate | 290 | 20 | | mg/L CaCO ₃ | 1 | 11/18/2010 8:15:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| <u>Total Dissolved Solids</u> | <u>1130</u> | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: 15-Dec-10

CLIENT: NMED
Lab Order: 1011679
Project: Grants Mining District
Lab ID: 1011679-06

Client Sample ID: GMD-03
Collection Date: 11/9/2010 10:36:00 AM
Date Received: 11/17/2010
Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|--|-------------|------|------|------------|----|-----------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SRM |
| Chloride | 68 | 10 | | mg/L | 20 | 11/30/2010 2:04:37 PM |
| Nitrate (As N)+Nitrite (As N) | ND | 1.0 | | mg/L | 5 | 12/6/2010 9:45:59 PM |
| <u>Sulfate</u> | <u>470</u> | 10 | | mg/L | 20 | 11/20/2010 7:18:46 AM |
| SM 2320B: ALKALINITY | | | | | | Analyst: IC |
| Alkalinity, Total (As CaCO3) | 320 | 20 | | mg/L CaCO3 | 1 | 11/18/2010 8:33:00 PM |
| Carbonate | 24 | 2.0 | | mg/L CaCO3 | 1 | 11/18/2010 8:33:00 PM |
| Bicarbonate | 300 | 20 | | mg/L CaCO3 | 1 | 11/18/2010 8:33:00 PM |
| SM2540C MOD: TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KS |
| <u>Total Dissolved Solids</u> | <u>1130</u> | 20.0 | H | mg/L | 1 | 11/22/2010 4:45:00 AM |

Qualifiers:

* Value exceeds Maximum Contaminant Level
E Estimated value
J Analyte detected below quantitation limits
NC Non-Chlorinated
PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
MCL Maximum Contaminant Level
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

ANALYTICAL RESULTS

Project: 1011679
Pace Project No.: 3037552

Sample: 1011679-01C/GMD-00 **Lab ID:** 3037552001 **Collected:** 11/08/10 09:23 **Received:** 11/19/10 10:00 **Matrix:** Water
PWS: **Site ID:** **Sample Type:**

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0m | -0.132 ± 0.346 (0.768) | pCi/L | 11/29/10 14:43 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | 0.0746 ± 0.388 (0.775) | pCi/L | 11/29/10 14:43 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | -0.209 ± 0.240 (0.752) | pCi/L | 12/08/10 13:29 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | -0.893 ± 0.414 (0.982) | pCi/L | 12/07/10 16:58 | 15262-20-1 | |
| Uranium-234 | HSL-300m | -0.083 ± 0.098 (0.414) | | 12/03/10 18:53 | 13986-29-5 | |
| Uranium-235 | HSL-300m | 0.047 ± 0.127 (0.127) | | 12/03/10 18:53 | 15117-96-1 | |
| Uranium-238 | HSL-300m | -0.017 ± 0.097 (0.213) | | 12/03/10 18:53 | 7440-61-1 | |

Sample: 1011679-02C/GMD-01 **Lab ID:** 3037552002 **Collected:** 11/08/10 09:55 **Received:** 11/19/10 10:00 **Matrix:** Water
PWS: **Site ID:** **Sample Type:**

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0m | 1.28 ± 0.767 (1.13) | pCi/L | 11/28/10 16:50 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | 3.00 ± 0.877 (0.986) | pCi/L | 11/28/10 16:50 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | -0.070 ± 0.238 (0.650) | pCi/L | 12/08/10 13:29 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | 0.818 ± 0.518 (0.979) | pCi/L | 12/07/10 17:11 | 15262-20-1 | |
| Uranium-234 | HSL-300m | 1.598 ± 0.552 (0.311) | | 12/03/10 18:53 | 13986-29-5 | |
| Uranium-235 | HSL-300m | 0.147 ± 0.168 (0.133) | | 12/03/10 18:53 | 15117-96-1 | |
| Uranium-238 | HSL-300m | 0.864 ± 0.387 (0.272) | | 12/03/10 18:53 | 7440-61-1 | |

Sample: 1011679-03C/GMD-04 **Lab ID:** 3037552003 **Collected:** 11/08/10 13:35 **Received:** 11/19/10 10:00 **Matrix:** Water
PWS: **Site ID:** **Sample Type:**

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|-----------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0m | 17.3 ± 4.01 (3.04) | pCi/L | 11/28/10 16:51 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | 7.23 ± 1.80 (1.71) | pCi/L | 11/28/10 16:51 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | 3.33 ± 1.16 (0.622) | pCi/L | 12/08/10 13:29 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | 2.67 ± 0.750 (0.887) | pCi/L | 12/07/10 16:58 | 15262-20-1 | |
| Uranium-234 | HSL-300m | 1.255 ± 0.476 (0.319) | | 12/03/10 18:54 | 13986-29-5 | |
| Uranium-235 | HSL-300m | 0.036 ± 0.129 (0.238) | | 12/03/10 18:54 | 15117-96-1 | |
| Uranium-238 | HSL-300m | 0.877 ± 0.385 (0.265) | | 12/03/10 18:54 | 7440-61-1 | |

Sample: 1011679-04C/GMD-05 **Lab ID:** 3037552004 **Collected:** 11/08/10 13:35 **Received:** 11/19/10 10:00 **Matrix:** Water
PWS: **Site ID:** **Sample Type:**

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|------------------------|-------|----------------|------------|------|
| Gross Alpha | SM 7110C | 1.33 ± 1.46 (2.67) | pCi/L | 12/07/10 20:41 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | 6.11 ± 4.23 (6.72) | pCi/L | 11/28/10 16:58 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | 1.05 ± 0.714 (0.886) | pCi/L | 12/08/10 13:41 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | 1.39 ± 0.569 (0.938) | pCi/L | 12/07/10 16:58 | 15262-20-1 | |
| Uranium-234 | HSL-300m | 0.106 ± 0.146 (0.248) | | 12/03/10 18:54 | 13986-29-5 | |
| Uranium-235 | HSL-300m | -0.013 ± 0.148 (0.272) | | 12/03/10 18:54 | 15117-96-1 | |
| Uranium-238 | HSL-300m | 0.012 ± 0.113 (0.278) | | 12/03/10 18:54 | 7440-61-1 | |

ANALYTICAL RESULTS

Project: 1011679
Pace Project No.: 3037552

Sample: 1011679-05C/GMD-02 Lab ID: 3037552005 Collected: 11/09/10 09:36 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|------------------------|-------|----------------|------------|------|
| Gross Alpha | SM 7110C | 34.1 ± 7.43 (2.69) | pCi/L | 12/07/10 17:56 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | -0.301 ± 1.46 (2.32) | pCi/L | 11/28/10 16:51 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | 0.168 ± 0.235 (0.228) | pCi/L | 12/08/10 13:41 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | 0.277 ± 0.463 (0.990) | pCi/L | 12/07/10 16:58 | 15262-20-1 | |
| Uranium-234 | HSL-300m | 23.263 ± 4.392 (0.481) | | 12/03/10 18:54 | 13966-29-5 | |
| Uranium-235 | HSL-300m | 0.349 ± 0.312 (0.375) | | 12/03/10 18:54 | 15117-96-1 | |
| Uranium-238 | HSL-300m | 10.096 ± 2.169 (0.401) | | 12/03/10 18:54 | 7440-61-1 | |

Sample: 1011679-06C/GMD-03 Lab ID: 3037552006 Collected: 11/09/10 10:36 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
|-------------|------------|------------------------|-------|----------------|------------|------|
| Gross Alpha | SM 7110C | 22.8 ± 5.34 (2.71) | pCi/L | 12/07/10 20:18 | 12587-46-1 | |
| Gross Beta | EPA 900.0m | 1.60 ± 1.57 (2.38) | pCi/L | 11/24/10 20:39 | 12587-47-2 | |
| Radium-226 | EPA 903.1 | 0.160 ± 0.444 (0.860) | pCi/L | 12/08/10 13:41 | 13982-63-3 | |
| Radium-228 | EPA 904.0 | 0.839 ± 0.502 (0.939) | pCi/L | 12/07/10 17:11 | 15262-20-1 | |
| Uranium-234 | HSL-300m | 20.137 ± 4.079 (0.600) | | 12/03/10 18:54 | 13966-29-5 | |
| Uranium-235 | HSL-300m | 0.533 ± 0.406 (0.206) | | 12/03/10 18:54 | 15117-96-1 | |
| Uranium-238 | HSL-300m | 9.107 ± 2.127 (0.424) | | 12/03/10 18:54 | 7440-61-1 | |

QUALIFIERS

Project: 1011679
Pace Project No.: 3037552

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins NE, Suite D

Albuquerque, New Mexico 87109-4372

TEL: 5053453975

FAX: 5053454107

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

3037352

Subcontractor:

Pace Analytical Services, Inc.
1638 Roseytown Rd Ste 2,3,4
Greensburg, PA 15601

TEL: (724) 850-5600
FAX: (724) 850-5601
Acct #:

Project Name: 1011679

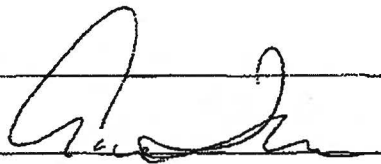
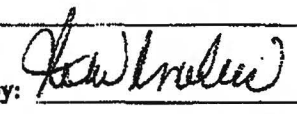
17-Nov-10

| Lab ID | Client Sample ID | Matrix | Collection Date | Bottle Type | Requested Tests | |
|-------------|------------------|--------|-----------------|-----------------------|-----------------|-----------|
| 1011679-01C | 001 | GMD-00 | Aqueous | 11/8/2010 9:23:00 AM | 1LHDPEHNO3 | SEE BELOW |
| 1011679-02C | 002 | GMD-01 | Aqueous | 11/8/2010 9:55:00 AM | 1LHDPEHNO3 | SEE BELOW |
| 1011679-03C | 003 | GMD-04 | Aqueous | 11/8/2010 1:35:00 PM | 1LHDPEHNO3 | SEE BELOW |
| 1011679-04C | 004 | GMD-05 | Aqueous | 11/8/2010 1:35:00 PM | 1LHDPEHNO3 | SEE BELOW |
| 1011679-05C | 005 | GMD-02 | Aqueous | 11/9/2010 9:36:00 AM | 1LHDPEHNO3 | SEE BELOW |
| 1011679-06C | 006 | GMD-03 | Aqueous | 11/9/2010 10:36:00 AM | 1LHDPEHNO3 | SEE BELOW |

ANALYTICAL COMMENTS:

GW SAMPLES-01C THRU 06C-GROSS ALPHA/BETA, ISOTOPIC U, RADIUM 226/228

Standard TAT. Please fax (505) 345-4107 results when completed, or email to lab@hallenvironmental.com. Thank you.

| | | | |
|--|---------------------|--|--------------------------|
| Relinquished by:  | Date/Time: 11/17/10 | Received by:  | Date/Time: 11/19/10 1000 |
| Relinquished by: _____ | _____ | Received by: _____ | _____ |



ISOTECH

ISOTECH LABORATORIES INC

www.isotechlabs.com

1308 Parkland Court Champaign, IL 61821-1826 | 877.362.4190 217.398.3490 217.398.3493 Fax

December 1, 2010

Anne Thorne
Hall Environmental Analysis Lab, Inc.
4901 Hawkins NE, Suite D
Albuquerque NM 87109-4372

Dear Anne,

Enclosed are the hard copy analysis reports for the water samples collected as part of your Project 1011679. These samples were assigned to Isotech job number 14207. These are the same data that were emailed to you earlier.

We will hold the samples until 12/31/10 in case you would want any additional analyses carried out, and will then dispose of the remaining sample material. If you need us to hold the samples longer, please contact us.

If you have any questions or if there is anything else we can do for you, please do not hesitate to contact us. Thank you for choosing Isotech for your analysis needs, we appreciate your business.

Sincerely,

Steven R. Pelphrey
Laboratory Manager

Enclosures (6)

Water Analysis

Lab Number: 198790

Job Number: 14207

Submitter Sample Name: 1011679-01D / GMD-00

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/08/2010

Results Reported: 12/01/2010

 δD of water ----- -57.9 ‰ relative to VSMOW $\delta^{18}O$ of water ----- -8.16 ‰ relative to VSMOW

Tritium content of water ----- na

 $\delta^{13}C$ of DIC ----- na ^{14}C content of DIC ----- na $\delta^{15}N$ of nitrate ----- na $\delta^{18}O$ of nitrate ----- na $\delta^{34}S$ of sulfate ----- na $\delta^{18}O$ of sulfate ----- na

Remarks:

Water Analysis

Lab Number: 198791

Job Number: 14207

Submitter Sample Name: 1011679-02D / GMD-01

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/08/2010

Results Reported: 12/01/2010

 δD of water ----- -80.3 ‰ relative to VSMOW $\delta^{18}O$ of water ----- -11.08 ‰ relative to VSMOW

Tritium content of water ----- na

 $\delta^{13}C$ of DIC ----- na ^{14}C content of DIC ----- na $\delta^{15}N$ of nitrate ----- na $\delta^{18}O$ of nitrate ----- na $\delta^{34}S$ of sulfate ----- na $\delta^{18}O$ of sulfate ----- na

Remarks:

**ISOTECH**

ISOTECH LABORATORIES INC

ANALYSIS REPORT**Water Analysis**

Lab Number: 198792

Job Number: 14207

Submitter Sample Name: 1011679-03D / GMD-04

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/08/2010

Results Reported: 12/01/2010

 δ D of water ----- -79.1 ‰ relative to VSMOW $\delta^{18}\text{O}$ of water ----- -10.38 ‰ relative to VSMOW

Tritium content of water ----- na

 $\delta^{13}\text{C}$ of DIC ----- na ^{14}C content of DIC ----- na $\delta^{15}\text{N}$ of nitrate ----- na $\delta^{18}\text{O}$ of nitrate ----- na $\delta^{34}\text{S}$ of sulfate ----- na $\delta^{18}\text{O}$ of sulfate ----- na

Remarks:

**ISOTECH**

ISOTECH LABORATORIES INC

ANALYSIS REPORT**Water Analysis**

Lab Number: 198793

Job Number: 14207

Submitter Sample Name: 1011679-04D / GMD-05

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/08/2010

Results Reported: 12/01/2010

 δD of water ----- -91.9 ‰ relative to VSMOW $\delta^{18}O$ of water ----- -11.82 ‰ relative to VSMOW

Tritium content of water ----- na

 $\delta^{13}C$ of DIC ----- na ^{14}C content of DIC ----- na $\delta^{15}N$ of nitrate ----- na $\delta^{18}O$ of nitrate ----- na $\delta^{34}S$ of sulfate ----- na $\delta^{18}O$ of sulfate ----- na

Remarks:

**ISOTECH**

ISOTECH LABORATORIES INC

ANALYSIS REPORT**Water Analysis**

Lab Number: 198794

Job Number: 14207

Submitter Sample Name: 1011679-05D / GMD-02

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/09/2010

Results Reported: 12/01/2010

 δ D of water ----- -80.9 ‰ relative to VSMOW δ^{18} O of water ----- -10.35 ‰ relative to VSMOW

Tritium content of water ----- na

 δ^{13} C of DIC ----- na 14 C content of DIC ----- na δ^{15} N of nitrate ----- na δ^{18} O of nitrate ----- na δ^{34} S of sulfate ----- na δ^{18} O of sulfate ----- na

Remarks:

Water Analysis

Lab Number: 198795

Job Number: 14207

Submitter Sample Name: 1011679-06D / GMD-03

Submitter Sample ID:

Submitter Job #:

Company: Hall Environmental Analysis Lab, Inc

Field or Site: Project 1011679

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 11/09/2010

Results Reported: 12/01/2010

| | | |
|---------------------------|-------|----------------------------|
| δD of water | ----- | -80.3 ‰ relative to VSMOW |
| $\delta^{18}O$ of water | ----- | -10.24 ‰ relative to VSMOW |
| Tritium content of water | ----- | na |
| $\delta^{13}C$ of DIC | ----- | na |
| ^{14}C content of DIC | ----- | na |
| $\delta^{15}N$ of nitrate | ----- | na |
| $\delta^{18}O$ of nitrate | ----- | na |
| $\delta^{34}S$ of sulfate | ----- | na |
| $\delta^{18}O$ of sulfate | ----- | na |

Remarks:



*Consistent Accuracy . . .
... Delivered On-time*

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
www.radiocarbon.com

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

December 3, 2010

Ms. Anne Thorne
Hall Environmental Analysis
Laboratory, Incorporated
4901 Hawkins NE, Suite D
Albuquerque, NM 87109

RE: Radiocarbon Dating Results For Samples 1011679-01E, 1011679-02E, 1011679-03E, 1011679-04E, 1011679-05E, 1011679-06E

Dear Ms. Thorne:

Enclosed are the radiocarbon dating results for six samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses went normally. The analyses was performed on the DIC within the submitted waters. Results are reported both as fraction of modern (Fmdn) and as the Apparent Radiocarbon Age. The report sheet also includes the method used, material type, and applied pretreatments.

The reported Apparent Radiocarbon Ages have not been corrected for any effects. They do not necessarily represent the residence time of the water within the aquifer. That would have to be derived by incorporating the radiocarbon dating result into models which take hydrologic conditions into account. The Apparent Radiocarbon Age is used as a relational tool, of understandable units to the layman, to interpret hydrologic differences between wells and to monitor temporal changes. For example, if semi-annual measurements on the same well provided consecutively decreasing apparent ages, it may indicate over-pumping or eminent surface water uptake.

We analyzed these samples on a sole priority basis. No students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analysis. We analyzed them with the combined attention of our entire professional staff.

Information pages are also enclosed with the mailed copy of this report. If you have any specific questions about the analysis, please do not hesitate to contact us. Someone is always available to answer your questions.

The cost of the analysis was charged to the MASTERCARD card provided. A receipt is enclosed with the mailed report copy. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,


Digital signature on file

**BETA ANALYTIC INC.**

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX: 305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Ms. Anne Thorne

Report Date: 12/3/2010

Hall Environmental Analysis Laboratory, Incorporated

Material Received: 11/18/2010

| Sample Data | Apparent C14 Age (fraction modern) | C13/C12 Ratio |
|--|--|------------------|
| Beta - 288363 | 5150 +/- 40 BP (Fmdn 0.5267 +/- 0.0026) | -19.7 o/oo |
| SAMPLE : 1011679-01E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |
| Beta - 288364 | 890 +/- 40 BP (Fmdn 0.8951 +/- 0.0043) | -11.4 o/oo |
| SAMPLE : 1011679-02E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |
| Beta - 288365 | 3690 +/- 50 BP (Fmdn 0.6317 +/- 0.0038) | -10.1 o/oo |
| SAMPLE : 1011679-03E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |
| Beta - 288366 | 28170 +/- 130 BP (Fmdn 0.0300 +/- 0.0005) | -11.5 o/oo |
| SAMPLE : 1011679-04E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the ¹⁴C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby ¹⁴C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured ¹³C/¹²C ratios (delta ¹³C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta ¹³C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta ¹³C, the ratio and the Conventional Radiocarbon Age will be followed by "a". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

**BETA ANALYTIC INC.**

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX: 305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Ms. Anne Thorne

Report Date: 12/3/2010

| Sample Data | Apparent C14 Age (fraction modern) | C13/C12 Ratio |
|--|--|------------------|
| Beta - 288367 | 8150 +/- 40 BP (Fmdn 0.3626 +/- 0.0018) | -9.7 o/oo |
| SAMPLE : 1011679-05E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |
| Beta - 288368 | 7890 +/- 40 BP (Fmdn 0.3745 +/- 0.0018) | -8.5 o/oo |
| SAMPLE : 1011679-06E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the ^{14}C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby ^{14}C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured $^{13}\text{C}/^{12}\text{C}$ ratios (delta ^{13}C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta ^{13}C . On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta ^{13}C , the ratio and the Conventional Radiocarbon Age will be followed by "an". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.



*Consistent Accuracy
Delivered On Time*

Beta Analytic Inc

4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com
www.radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

The Radiocarbon Laboratory Accredited to ISO-17025 Testing Standards (PJLA Accreditation #59423)

Final Report

The final report package includes the final date report, a statement outlining our analytical procedures, a glossary of pretreatment terms, calendar calibration information, billing documents (containing balance/credit information and the number of samples submitted within the yearly discount period), and peripheral items to use with future submittals. The final report includes the individual analysis method, the delivery basis, the material type and the individual pretreatments applied. The final report has been sent by mail and e-mail (where available).

Pretreatment

Pretreatment methods are reported along with each result. All necessary chemical and mechanical pretreatments of the submitted material were applied at the laboratory to isolate the carbon, which may best represent the time event of interest. When interpreting the results, it is important to consider the pretreatments. Some samples cannot be fully pretreated, making their ^{14}C ages more subjective than samples, which can be fully pretreated. Some materials receive no pretreatments. Please look at the pretreatment indicated for each sample and read the pretreatment glossary to understand the implications.

Analysis

Materials measured by the radiometric technique were analyzed by synthesizing sample carbon to benzene (92% C), measuring for ^{14}C content in one of 53 scintillation spectrometers, and then calculating for radiocarbon age. If the Extended Counting Service was used, the ^{14}C content was measured for a greatly extended period of time. AMS results were derived from reduction of sample carbon to graphite (100 %C), along with standards and backgrounds. The graphite was then detected for ^{14}C content in one of 9 accelerator-mass-spectrometers (AMS).

The Radiocarbon Age and Calendar Calibration

The "Conventional ^{14}C Age (*)" is the result after applying $^{13}\text{C}/^{12}\text{C}$ corrections to the measured age and is the most appropriate radiocarbon age. If an "*" is attached to this date, it means the $^{13}\text{C}/^{12}\text{C}$ was estimated rather than measured (The ratio is an option for radiometric analysis, but included on all AMS analyses.) Ages are reported with the units "BP" (Before Present). "Present" is defined as AD 1950 for the purposes of radiocarbon dating.

Results for samples containing more ^{14}C than the modern reference standard are reported as "percent modern carbon" (pMC). These results indicate the material was respiring carbon after the advent of thermo-nuclear weapons testing and is less than ~ 50 years old.

Applicable calendar calibrations are included for materials between about 100 and 19,000 BP. If calibrations are not included with a report, those results were too young, too old, or inappropriate for calibration. Please read the enclosed page discussing calibration.

PRETREATMENT GLOSSARY

Standard Pretreatment Protocols at Beta Analytic

Unless otherwise requested by a submitter or discussed in a final date report, the following procedures apply to pretreatment of samples submitted for analysis. This glossary defines the pretreatment methods applied to each result listed on the date report form (e.g. you will see the designation "acid/alkali/acid" listed along with the result for a charcoal sample receiving such pretreatment).

Pretreatment of submitted materials is required to eliminate secondary carbon components. These components, if not eliminated, could result in a radiocarbon date, which is too young or too old. Pretreatment does not ensure that the radiocarbon date will represent the time event of interest. This is determined by the sample integrity. Effects such as the old wood effect, burned intrusive roots, bioturbation, secondary deposition, secondary biogenic activity incorporating recent carbon (bacteria) and the analysis of multiple components of differing age are just some examples of potential problems. The pretreatment philosophy is to reduce the sample to a single component, where possible, to minimize the added subjectivity associated with these types of problems. If you suspect your sample requires special pretreatment considerations be sure to tell the laboratory prior to analysis.

"acid/alkali/acid"

The sample was first gently crushed/dispersed in deionized water. It was then given hot HCl acid washes to eliminate carbonates and alkali washes (NaOH) to remove secondary organic acids. The alkali washes were followed by a final acid rinse to neutralize the solution prior to drying. Chemical concentrations, temperatures, exposure times, and number of repetitions, were applied accordingly with the uniqueness of the sample. Each chemical solution was neutralized prior to application of the next. During these serial rinses, mechanical contaminants such as associated sediments and rootlets were eliminated. This type of pretreatment is considered a "full pretreatment". On occasion the report will list the pretreatment as "acid/alkali/acid - insolubles" to specify which fraction of the sample was analyzed. This is done on occasion with sediments (See "acid/alkali/acid - solubles")

Typically applied to: charcoal, wood, some peats, some sediments, and textiles "acid/alkali/acid - solubles"

On occasion the alkali soluble fraction will be analyzed. This is a special case where soil conditions imply that the soluble fraction will provide a more accurate date. It is also used on some occasions to verify the present/absence or degree of contamination present from secondary organic acids. The sample was first pretreated with acid to remove any carbonates and to weaken organic bonds. After the alkali washes (as discussed above) are used, the solution containing the alkali soluble fraction is isolated/filtered and combined with acid. The soluble fraction, which precipitates, is rinsed and dried prior to combustion.

"acid/alkali/acid/cellulose extraction"

Following full acid/alkali/acid pretreatments, the sample is bathed in (sodium chlorite) NaClO_2 under very controlled conditions (Ph = 3, temperature = 70 degrees C). This eliminates all components except wood cellulose. It is useful for woods that are either very old or highly contaminated.

Applied to: wood

"acid washes"

Surface area was increased as much as possible. Solid chunks were crushed, fibrous materials were shredded, and sediments were dispersed. Acid (HCl) was applied repeatedly to ensure the absence of carbonates. Chemical concentrations, temperatures, exposure times, and number of repetitions, were applied accordingly with the uniqueness of each sample. The sample was not be subjected to alkali washes to ensure the absence of secondary organic acids for intentional reasons. The most common reason is that the primary carbon is soluble in the alkali. Dating results reflect the total organic content of the analyzed material. Their accuracy depends on the researcher's ability to subjectively eliminate potential contaminants based on contextual facts.

Typically applied to: organic sediments, some peats, small wood or charcoal, special cases



*Consistent Accuracy
Delivered On Time*

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com
www.radiocarbon.com

The Radiocarbon Laboratory Accredited to ISO-17025 Testing Standards (PJLA Accreditation #59423)

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

Calendar Calibration at Beta Analytic

Calibrations of radiocarbon age determinations are applied to convert BP results to calendar years. The short-term difference between the two is caused by fluctuations in the heliomagnetic modulation of the galactic cosmic radiation and, recently, large scale burning of fossil fuels and nuclear devices testing. Geomagnetic variations are the probable cause of longer-term differences.

The parameters used for the corrections have been obtained through precise analyses of hundreds of samples taken from known-age tree rings of oak, sequoia, and fir up to about 10,000 BP. Calibration using tree-rings to about 12,000 BP is still being researched and provides somewhat less precise correlation. Beyond that, up to about 20,000 BP, correlation using a modeled curve determined from U/Th measurements on corals is used. This data is still highly subjective. Calibrations are provided up to about 19,000 years BP using the most recent calibration data available.

The Pretoria Calibration Procedure (Radiocarbon, Vol 35, No.1, 1993, pg 317) program has been chosen for these calendar calibrations. It uses splines through the tree-ring data as calibration curves, which eliminates a large part of the statistical scatter of the actual data points. The spline calibration allows adjustment of the average curve by a quantified closeness-of-fit parameter to the measured data points. A single spline is used for the precise correlation data available back to 9900 BP for terrestrial samples and about 6900 BP for marine samples. Beyond that, splines are taken on the error limits of the correlation curve to account for the lack of precision in the data points.

In describing our calibration curves, the solid bars represent one sigma statistics (68% probability) and the hollow bars represent two sigma statistics (95% probability). Marine carbonate samples that have been corrected for $^{13}\text{C}/^{12}\text{C}$, have also been corrected for both global and local geographic reservoir effects (as published in Radiocarbon, Volume 35, Number 1, 1993) prior to the calibration. Marine carbonates that have not been corrected for $^{13}\text{C}/^{12}\text{C}$ are adjusted by an assumed value of 0 ‰ in addition to the reservoir corrections. Reservoir corrections for fresh water carbonates are usually unknown and are generally not accounted for in those calibrations. In the absence of measured $^{13}\text{C}/^{12}\text{C}$ ratios, a typical value of -5 ‰ is assumed for freshwater carbonates.

(Caveat: the correlation curve for organic materials assume that the material dated was living for exactly ten years (e.g. a collection of 10 individual tree rings taken from the outer portion of a tree that was cut down to produce the sample in the feature dated). For other materials, the maximum and minimum calibrated age ranges given by the computer program are uncertain. The possibility of an "old wood effect" must also be considered, as well as the potential inclusion of younger or older material in matrix samples. Since these factors are in determinant error in most cases, these calendar calibration results should be used only for illustrative purposes. In the case of carbonates, reservoir correction is theoretical and the local variations are real, highly variable and dependent on provenience. Since imprecision in the correlation data beyond 10,000 years is high, calibrations in this range are likely to change in the future with refinement in the correlation curve. The age ranges and especially the intercept ages generated by the program must be considered as approximations.)

**BETA ANALYTIC INC.**

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX: 305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Ms. Anne Thorne

Report Date: 12/3/2010

| Sample Data | Apparent C14 Age (fraction modern) | C13/C12 Ratio |
|--|--|------------------|
| Beta - 288367 | 8150 +/- 40 BP (Fmdn 0.3626 +/- 0.0018) | -9.7 o/oo |
| SAMPLE : 1011679-05E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |
| Beta - 288368 | 7890 +/- 40 BP (Fmdn 0.3745 +/- 0.0018) | -8.5 o/oo |
| SAMPLE : 1011679-06E ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation | | |

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the ¹⁴C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby ¹⁴C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured ¹³C/¹²C ratios (delta ¹³C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta ¹³C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta ¹³C, the ratio and the Conventional Radiocarbon Age will be followed by "as". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.